

REMARKS

At the outset, Applicant wishes to point out that Claims 1, 2 and 4-6 were canceled in a Supplemental Amendment filed on August 3, 2005 and replaced by newly presented Claims 7-10. This Amendment was filed five days prior to the mailing date of the Office Action and, as a result, Claims 7-10 are properly before the Examiner. Newly presented Claims 11 and 12 are directed to a preferred embodiment of the present invention in which the solvent is toluene. No new matter has been added. Claims 1, 2 and 4 are rejected over 35 USC 103(a) as being unpatentable over Grella et al in view of Metzger. Claims 5 and 6 were rejected under 35 USC 103(a) as being unpatentable over Kober et al in view of the Aldrich catalog. Applicant respectfully traverses these grounds of rejection and urges reconsideration in light of the following comments.

The currently claimed invention is directed to a process for preparing 3-chloro-5-nitrotoluene, which comprises the steps of reacting 2-methyl-4-nitroaniline with t-butylhypochlorite in a neutral condition and in a solvent containing neither an acid or a base to obtain 2-chloro-4-nitro-6-methylaniline and deaminating a reactant mixture containing the 2-chloro-4-nitro-6-methylaniline by adding sodium nitrite to the reaction mixture adjusted to a temperature between room temperature and 0°C, allowing the reaction mixture to stand at an elevated temperature and then decreasing the temperature and maintaining the temperature at 40-50°C to obtain 3-chloro-5-nitrotoluene.

Another aspect of the present invention is directed to a process for preparing 3-chloro-5-methylphenylisocyanate which comprises the steps of reacting 2-methyl-4-nitroaniline with t-butylhypochlorite in a neutral condition to obtain 2-chloro-4-nitro-6-methylaniline and deaminating the reactant mixture containing the 2-chloro-4-nitro-6-methylaniline to obtain 3-chloro-5-nitrotoluene, reducing the 3-chloro-5-nitrotoluene

with a reducing agent to obtain a resultant product and reacting the resultant product with triphosgene.

As explained previously, the presently claimed invention enables the production of 3-chloro-5-nitrotoluene and the subsequent production of 3-chloro-5-methylphenylisocyanate in a large amount without any subsequent purification being needed and for the 3-chloro-5-nitrotoluene to be prepared under mild conditions, without a strong acid or strong base being needed. In the present invention, chlorination is achieved by t-butylhypochlorite. This results in the produced product having such a high purity that a purification step is not needed. It is respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention.

Grella et al discloses a process for preparing 3-chloro-5-nitrotoluene which involves the steps of mixing 4-methyl-2-nitroaniline and N-chlorosuccinimide and acetonitrile to produce 2-chloro-4-methyl-6-nitroaniline which is then cooled to 0°C and mixed with concentrated sulfuric acid and sodium nitrite to form a reaction mixture and the reaction mixture allowed to warm to room temperature. The reaction mixture is then refluxed until the evolution of nitrogen gas ceases and then concentrated under reduced pressure, diluted with water and extracted with ethylacetate. The combined organic fractions are then washed with brine, dried over anhydrous magnesium sulfate and the solid removed under a reduced pressure to produce 3-chloro-5-nitrotoluene product. This product is then purified by flash chromatography to yield an orange solid having a 69% purity.

The Grella et al reference has no disclosure with respect to using t-butylhypochlorite as the chlorinating agent for the 2-methyl-4-nitroaniline or the reaction mixture being maintained at a temperature of from 40-50°C during the deamination step. To supply these teachings, Metzger et al has been cited.

Metzger et al discloses a process for preparing a chlorinated diisocyanate, preferably carried out under substantially anhydrous conditions, which comprises the steps of adding a halogenation agent to 2,4- and/or 2,6-toluene diamine, which has preferably been dissolved in an inert organic solvent, at a temperature of from 10-90°C. As a halogenating agent, N-chlorosuccinimide and t-butylhypochlorite are disclosed as being used. In light of this disclosure, the Examiner has taken the position that Metzger et al teaches that t-butylhypochlorite is an equivalent or alternative to N-chlorosuccinimide as a chlorinating agent in the Grella et al process since Metzger et al teaches that N-chlorosuccinimide and t-butylhypochlorite are equivalent chlorinating agents of aromatic compounds having methyl and amino substituents. However, N-chlorosuccinimide and t-butylhypochlorite are not equivalents in the present invention. When N-chlorosuccinimide is used, succinimide is produced as a side-product and cannot be separated by filtration due to its low solubility. This necessitates further purification by crystallization or chromatography while, in contrast thereto, through the use of t-butylhypochlorite in the present invention, side products are completely removed by just filtration which enables the product to be produced in a high purity.

In order to further establish that t-butylhypochlorite and N-chlorosuccinimide are not equivalents, Applicant has carried out additional tests to establish the criticality of t-butylhypochlorite in the present invention. In the enclosed Declaration Under 37 CFR 1.132, 3-chloro-5-nitrotoluene was produced in the same way as in Example 1 of the present application except that N-chlorosuccinimide was used in place of t-butylhypochlorite. The resultant production yield was 2%. In contrast thereto, in Example 1 of the present application, the production rate of the chlorinating step was 80% and that of the deaminating step was 90% with a total

production rate of 72%. These results evidence the fact that the use of t-butylhypochlorite in the present invention as a chlorinating agent provides unexpectedly superior results to the use of N-chlorosuccinimide and, as a result, establishes the unobviousness of the presently claimed invention over the combination of Metzger et al with Grella et al.

The Kober et al reference discloses a process for preparing organic isocyanates by the reaction of corresponding organic nitro compounds with carbon monoxide in the presence of a catalyst in which the improvement comprises reacting carbon monoxide with a liquid suspension of the catalyst at an elevated pressure and an elevated temperature prior to reacting the organic nitro compound with carbon monoxide. However, this reference adds nothing with respect to obtaining 3-chloro-5-nitrotoluene according to the present invention using t-butylhypochlorite as a chlorinating agent and, as such, it is respectfully submitted that the secondary reference cited by the Examiner must provide these teachings in order for a proper showing of prima facie obviousness under 35 USC 103(a) to be made.

The Aldrich catalog has been cited for teaching that triphosgene can be a useful substitute for phosgene. First of all, the context in which triphosgene can be used as a substituent for phosgene is not given. Applicant is sure the Examiner will admit that phosphene is not equivalent with triphosgene in all chemical reactions. More importantly, this reference adds nothing to the teachings of the primary Kober et al reference with respect to the currently claimed method of obtaining 3-chloro-5-nitrotoluene and, as such, it is respectfully submitted that the currently claimed invention is clearly patentably distinguishable over the combination of the All-Rich catalog with Kober et al.

An executed copy of the Declaration Under 37 CFR 1.132 will be submitted to the Patent Office upon Applicant's Representatives' receipt of same from Japan.

Reconsideration of the present application and the
passing f it to issue is respectfully solicited.

Respectfully submitted,


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Encl: Unexecuted Declaration Under 37 CFR 1.132 (1)
Debit Note (2)

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